Introgression of Characters From Genetically Engineered Canola (*Brassica napus* L.) Crops to Related Weed Species

By: Harikumar S. Nair
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Major Professor: Jack Brown Ph. D.

ABSTRACT

Large-scale cultivation of genetically engineered crops expressing desirable traits from other species have raised several concerns. These include problems such as increased weediness and changes in pre- and post-harvest handling requirements and the potential introgression of the transgenes into related weedy species. Detailed studies to determine the risks of large-scale cultivation of genetically engineered crops are warranted and will help in developing strategies to avoid, or minimize, undesirable transgene flow into the ecosystem. The objective of this study was to determine potential gene flow between transgenic canola (*Brassica napus* L.) and related weeds, and the potential for the survival of crop X weed hybrids.

Two lines of transgenic canola resistant to glufosinate herbicide, field mustard (*B. rapa*), black mustard (*B. nigra*), and wild mustard (*Sinapis arvensis*) were cross-pollinated under greenhouse conditions, in all possible combinations, including reciprocals. Pollen compatibility, embryo and endosperm development stages, and rate of development was observed in all crosses to determine potential for hybrid seed development. Relative leaf growth parameters of F_1 and F_2 hybrids from successful crosses and their backcross progeny were compared to the parental lines.

Crosses between transgenic canola and field mustard seemed most likely to produce mature hybrid seeds. This probability was higher when canola was used as the female parent. Mature-II stage embryos were observed in crosses between canola and wild mustard and mature-I stage embryos were observed in transgenic canola x black mustard cross. This also suggests the possibility of producing mature, viable hybrid seeds between canola and black mustard, and between canola and wild mustard. The

maternal parent had a greater influence in determining successful hybridization and production of mature seed. Hybrids formed between transgenic herbicide resistant canola, field mustard and their back crosses to the parents were at least as competitive as the parents. Overall, there is potential for the introgression of transgenes from canola to closely related weed species in nature, and at least an indication that these transgenes will exist and be sustained in weed populations in the ecosystem.